National Library of Canada
Bibliothèque nationale du Canada

Canadian Theses Service
Service des thèses canadiennes

Ottawa, Canada
K1A 0N4

NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30, and subsequent amendments.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30, et ses amendements subséquents.

NL-339 (r. 88/04) c

Canada

UNIVERSITY OF ALBERTA

THE REVISION PERFORMANCE OF HEARING IMPAIRED WRITERS

by

GAIL ANNETTE EDMUNDS

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

FALL, 1991

National Library of Canada
Bibliothèque nationale du Canada

Canadian Theses Service
Service des thèses canadiennes

Ottawa, Canada
K1A 0N4

The author has granted an irrevocable non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of his/her thesis by any means and in any form or format, making this thesis available to interested persons.

The author retains ownership of the copyright in his/her thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without his/her permission.

L'auteur a accordé une licence irrévocable et non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de sa thèse de quelque manière et sous quelque forme que ce soit pour mettre des exemplaires de cette thèse à la disposition des personnes intéressées.

L'auteur conserve la propriété du droit d'auteur qui protège sa thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

ISBN 0-315-70014-9

Canada

UNIVERSITY OF ALBERTA

RELEASE FORM

NAME OF AUTHOR: Gail Annette Edmunds

TITLE OF THESIS: The Revision Performance of Hearing Impaired Writers

DEGREE: Master of Education

YEAR THIS DEGREE GRANTED: 1991

Permission is hereby granted to the University of Alberta Library to reproduce single copies of this thesis and to lend or sell such copies for private, scholarly or scientific research purposes only.

The author reserves all other publication and other rights in association with the copyright in the thesis, and except as hereinbefore provided neither the thesis nor any substantial portion thereof may be printed or otherwise reproduced in any material form whatever without the author's prior written permission.

Gail Edmunds

41-96 Lewes Boulevard
Whitehorse, Yukon
Y1A 4S6

Date: July 18, 1991

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled THE REVISION PERFORMANCE OF HEARING IMPAIRED WRITERS submitted by GAIL ANNETTE EDMUNDS in partial fulfillment for the degree of MASTER OF EDUCATION.

Dr. E. A. Conn-Blowers

Dr. C. Cumming

Dr. J. Edwards

Date: July 18, 1991

DEDICATION

I dedicate this research to my husband, Alan, the wind beneath my wings.

ABSTRACT

The present study was undertaken to examine the revision performance of two groups of deaf students and to explore the relationship between revision performance and reading comprehension levels. External texts with pre-planned textual flaws were presented to twenty-nine deaf writers. The thirteen students in the first group ranged from age ten to age fourteen and attended either upper elementary or junior high school whereas the sixteen students in the second group ranged from age fifteen to age twenty and attended either senior high school or a post-secondary institution. The revision performance of these writers improved over age with the older students performing significantly more acceptable surface level revisions ($p<.05$). The older students also tended to correct a larger number of acceptable semantic revisions, and revisions to deafisms, although these tendencies were not statistically significant. As well, there was a significant correlation between the students' revision performance and their performance on the reading comprehension subtest of the Canadian Achievement Tests ($p<.05$). An examination of the performance of the total number of students in the two groups on the revision tasks revealed that the percentage of textual flaws revised acceptably ranged from 50% to 88% depending on the subjects' ages and the type of revision required. These results confirm that deaf writers detect and revise flaws in external texts and develop revision skills over time. Implications for further research are discussed.

ACKNOWLEDGEMENTS

This research was formulated, subsequently conducted in the field, and then written as a thesis with the help of several persons, all of whom were critical to the success of the project.

First, I would like to extend my gratitude to Dr. Ceinwen Cumming and Dr. Elizabeth Conn-Blowers who together supervised the research. Dr. Cumming's excellent guidance and support, as well as her insight into the nature of the study, were evident throughout the entire project. Dr. Conn-Blower's expertise in the area of educational research was also a valuable asset as she was able to provide practical suggestions which facilitated the completion of the thesis. A thank you as well to the third member of my thesis committee, Dr. Joyce Edwards, who helped in the editing of the research proposal and the final thesis manuscript.

I am especially indebted to the many students, parents and school administrators who allowed me to investigate the revision performance of deaf writers. I would like to express a special thank you to the staff and students of the Alberta School for the Deaf who were most enthusiastic in accomodating my research.

My gratitude is also extended to Dr. David Cumming who gave of his valuable time to aid in the statistical analysis of the data.

Finally, I would like to express my deepest thanks to my husband, Alan, and my children, Andrea and Lindsey, for their endless patience, encouragement and love. The thesis would not have progressed past the idea stage without their support.

TABLE OF CONTENTS

	Page
Chapter I - Introduction	
Background and Rationale for the Study	1
Objectives	3
Definition of Terms	4
Overview	7
Chapter II - Literature Review	
Revision: An Integral Component of the Writing Process	9
Hearing Students' Revision	12
Deaf Students' Writing	15
Deaf Students' Revision	18
Present Study	23
Statement of Hypotheses	25
Chapter III - Method and Design	
Subjects	26
Instruments	30
Data Collection	34
Analysis of Data	37
Chapter IV - Results	
Hypothesis I	38
Hypothesis II	40
Overall Revision Performance	41
Subsidiary Analyses	43
Teacher Questionnaire	48
Summary	48
Chapter V - Discussion	
Hypothesis I	50
Hypothesis II	51
Overall Revision Performance	52
Subsidiary Analyses	54
Teacher Questionnaire	57
Limitations and Implications	57

Further Research..... 58
Summary..... 59

References..... 60

Appendices

Appendix I - Examples of Deafisms..... 66
Appendix II - Consent Forms..... 67
Appendix III - Teacher Questionnaire..... 69
Appendix IV - Training Session Text..... 72
Appendix V - Treatment Phase Texts..... 73

LISTING OF TABLES

		Page
Table 1	Subject Information for Group A	28
Table 2	Subject Information for Group B	29
Table 3	The Raven and Converted Grades for the Raven's Standard Progressive Matrices	33
Table 4	Mean Number of Textual Flaws Revised Acceptably with Percentages in Parentheses	39
Table 5	Pearson Correlation Coefficients	41
Table 6	Percentage of Various Error Types Revised Acceptably	42
Table 7	Percentage of Attempted but Unacceptable Revisions	43
Table 8	Means and Standard Deviations of Students' Performance on the Canadian Achievement Tests (CAT)	44
Table 9	Means and Standard Deviations of Students' Performance on the Raven's Standard Progressive Matrices (SPM)	45
Table 10	Ranges and Means of Hearing Losses	46
Table 11	Summary of Significant Research Findings	48

CHAPTER I

INTRODUCTION

The present study was undertaken to examine the revision performance of two groups of deaf students who attended educational institutions in a western Canadian province. The students in the first group ranged from age ten to age fourteen and attended either upper elementary or junior high school whereas the students in the second group ranged from age fifteen to age twenty and attended either senior high school or a post-secondary institution. The relationship between the revision performance and the reading comprehension of the total number of students in the two groups was also explored. In addition, revised texts were examined for percentage of revisions made correctly. The background and rationale for the study, objectives of the study, definition of terms, and an overview are presented in this chapter.

Background and Rationale for the Study

During the past decade, there has been a heightened interest in the psychological processes involved in writing. In the area of cognitive science, this interest has been reflected in examinations of the components of the writing process. Subsequently, revision has been recognized as one of the complex and vital components of writing (Hayes & Flower, 1986). Assumptions that revision is a minor component of the novice writing process (Bereiter & Scardamalia, 1987; Comeaux & Lehrer, 1987) may be in error as recent

researchers (Edmunds, Cameron, Linton & Hunt, 1988) have confirmed that young hearing writers revise texts more successfully than previously reported.

There have been many investigations focussing on the written productions of deaf individuals and, as Johnson, Liddell and Erting (1989) reported, it has been well established that the level of deaf high school students' writing skills is far below the standards set by their hearing peers. Despite the plethora of research into the writing of deaf individuals, there have been very few examinations of the revision performance of these writers (Livingston, 1989). The present study was designed to explore this component of writing as it is essential to provide educators with information that may facilitate writing skill development within this population. As Gormley and Sarachan-Deily (1987) stated:

> Active, thoughtful revision should enable writers, either hearing-impaired or normal hearing, to improve their writing... Hearing-Impaired writers generally need to be taught that writing evolves in stages and that the writer must also be a critical reader at all stages. Hearing-impaired students' writing could be improved through revision focusing first on content, then on major linguistic difficulties, and finally on surface mechanics.....
>
> (Gormley & Sarachan-Deily, 1987, p.164)

The acquisition of revision skills, then, may enable deaf writers to attain higher levels of English language competency.

In this research into the revision performance of deaf writers, the language delay faced by deaf children was acknowledged and subsequently adolescent deaf children were recognized as beginning, or novice, writers. As well, given the difficulties that language-related tasks present to deaf children, special issues such as the cognitive processing of extended passages were addressed. Thus, the rationale for this study was to investigate and contribute preliminary information on the revision performance of novice deaf writers.

Objectives

The study had two specific objectives. The first objective was to compare the revision performance of younger deaf students to the revision performance of older deaf students. The second objective was to explore any existing relationship between revision performance and reading comprehension levels. In addition, the overall revision performance of the students was considered and the following variables were examined: 1) hearing loss; 2) age of onset of hearing loss; 3) intellectual ability; 4) educational setting; and, 5) gender.

These research objectives may appear to be self-evident, especially when considering hearing students. However, the target population in this study is deaf students who present a more complex picture than do their hearing counterparts. Deaf students have severe or profound hearing losses and consequently have been subject to severe sensory and oral-aural language deprivation (Rodda & Grove, 1987). They have been described as

deviant writers (Kretschmer and Kretschmer, 1978) and as writers who graduate high school with the writing skills of a hearing fourth grader (Johnson, Liddell & Erting, 1989). Johnson et al. also reported that the average reading level of young deaf adults is at the third or fourth grade equivalent. With these highly restricted reading levels, it is questionable whether deaf students' revision skills, as they progress from the upper elementary to the secondary and post secondary levels, will continue to improve or whether their skills will remain at a similar early level. As for the relationship between revision performance and reading ability, while it is most logical that reading ability would correlate highly with a language-related task, such as the revision of textual flaws, it is not an assumption to be made with this highly heterogeneous population without further investigation (Wood et al., 1986).

Definition of Terms

To promote clarity for the reader, topic-related terms used in the thesis are defined below.

Deaf/Deafness*

The Conference of Executives of American Schools for the Deaf defines a *deaf* individual as "one whose hearing is disabled to an extent (usually 70 dB ISO or greater) that precludes the understanding of speech through the ear alone, with or without the use of a hearing aid" (Moores, 1982, p.6). In this study the terms "deaf" and "deafness" refer to a hearing threshold level equal

or greater than 70 dB in the better ear. The average threshold equals the mean of the pure tone thresholds obtained at 500, 1,000 and 2,000 Hertz. *Some members of the deaf community have recently voiced dislike for the term "hearing impaired" because of the negative connotation denoted by the word "impaired". "Deaf" and "hard of hearing" are the preferred terms. Therefore, where possible, these preferred terms will be utilized.

Novice Writer

In this study a *novice writer* refers to an individual whose writing is characteristic of that displayed by hearing students in elementary school who are beginning writers.

Revision

Revision, according to Webster's Third New Dictionary of the English Language (1961), means "the act or process of reading over carefully and correcting, improving, or updating where necessary" (p. 1945). Fitzgerald and Markham (1987) refer to revision as a "cognitive problem-solving process in that it involves detection of mismatches between intended and instantiated [written] texts, decisions about how to make desired changes, and making the desired changes" (p. 5). While some individuals would argue that the term "revision" can only be used in reference to a writer correcting his or her own writing, the present researcher has adopted the more global definition of revision. In this study revision refers to changes, made by the subject, to correct pre-planned textual flaws in external texts written by the researcher.

Editing

The dictionary refers to *editing* as "revising and making ready for publication". As the revision tasks in this study were being presented as texts which were being prepared for publication, the term "editing" was used with the participating students, a familiar term, since it was used frequently by their teachers.

Surface level errors

In this study *surface level errors* are textual flaws which include incorrect spelling, missing punctuation, missing capitalization, and incorrect usage of capitalization.

Semantic level errors

In this study *semantic level errors* are textual flaws which include sentences that are out of order, information that is not consistent with the story, and ambiguous information.

Deafisms

Deafisms are textual errors which are typically found in the written productions of deaf individuals. In this study, deafisms include *be* deletion, conjunction deletion, negative outside the sentence, incorrectly inflected infinitive, and the use of an infinitive to replace a gerund. Examples of deafisms are given in Appendix I.

Reading Comprehension Level

In this study an individual's *reading comprehension level* refers to his or her score on the reading comprehension subtest of the Canadian Achievement Tests (1982).

Intellectual Ability

An individual's *intellectual ability*, in this study, refers to his or her score on the Raven's Standard Progressive Matrices (1983), a measure of non-verbal reasoning.

Overview

This chapter has provided an introduction to the problem including general background information, the objectives of the study and definitions of terms used in the thesis.

A review of the literature beginning with a discussion of revision as an integral component of the writing process is included in Chapter II. The review focuses on the writing, and particularly, the revision performance of both hearing and deaf writers. The variables of hearing loss, age, reading comprehension levels and intellectual ability are also discussed. The chapter concludes with a statement of the hypotheses.

Chapter III provides an overview of the methodology used to conduct the study including information pertaining to subjects, assessment instruments, data collection, and data analysis.

In Chapter IV the results of the data analysis are presented. Conclusions, limitations and implications of the study and suggestions for further research are discussed in Chapter V.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter of the thesis presents a review of the literature relevant to the issue under investigation. Important areas which are surveyed include revision as a component of the writing process, hearing children's revision performance, deaf students' writing, and deaf students' revision performance. The chapter concludes with a statement of the hypotheses.

Revision: An Integral Component of the Writing Process

Written communication has become the focus of much cognitive research in the past decade (Bereiter & Scardamalia, 1987; Comeau & Lehrer, 1987; Hayes & Flower, 1980, 1986; Scardamalia & Bereiter, 1982). One of the most popular models of writing to emerge in the 1980's is that proposed by Hayes and Flower (1980, 1986). They describe writing as a problem-solving activity consisting of three major processes; planning, sentence generation, and revising. "In planning, the writer generates ideas and organizes them into a writing plan. In sentence generation, the writer produces formal sentences intended to be part of a draft. In revising, the writer attempts to improve a draft." (Hayes & Flower, 1986, p. 1107). These three processes are highly connected and cyclical, that is to say, writing is recursive in nature.

Since the Hayes and Flower model was introduced, D'Arcy (1989) has proposed another interesting model. The emphasis of the model is on the

"writing journey", a journey that has "meaning-shaping" as its primary purpose. D'Arcy described this journey as follows:

> ... basically three stages of meaning-shaping are involved: an exploratory stage which may involve several modes of expression - especially brief "bursts" of writing, talking, drawing, mapping, diagramming; a continuous draft; and the revision or editing of that draft for meaning and for mechanics.
>
> (D'Arcy, 1989, p. 50)

Like Hayes and Flower, then, D'Arcy places great importance in the revision or editing stage.

Revision, as an integral component of the writing process, requires definition. Fitzgerald and Markham (1987) provide a global definition based upon the literature on cognitive processes in writing:

> Revision means making any changes at any point in the writing process. It is a cognitive problem-solving process in that it involves detection of mismatches between intended and instantiated [written] texts, decisions about how to make desired changes, and making the desired changes. Changes might or might not affect meaning of the text, and they might be major or minor. Also changes might be made in the writer's mind before text is written on paper, while text is written, and/or after text is written.
>
> (Fitzgerald & Markham, 1987, p. 5)

There are researchers who define revision in somewhat different terms. For example, Moffett (1979) spoke of writing as the *revision* of inner

speech. He stated that "the chief reason for defining writing as revision of inner speech is to insure that writing be acknowledged as nothing less than thinking, manifested in a verbal way, and to make sure that it is taught accordingly" (p. 278). However, the writer will use Fitzgerald and Markham's global definition of revision as it offers a comprehensive explanation of the cognitive process of revision and makes it clear that revision is a complex and vital component of the writing process.

As Fitzgerald and Markham (1987) stated, revision refers to changes made by the writer at any point in the writing process. Consequently, when examining this component of writing, researchers have focussed on the revisions writers make to their own writing. However, particularly with children, this research may be biased by factors such as a reluctance to change what has been so laboriously produced (Graves, 1983), varying familiarity with the topic (Faigley & Witte, 1981), and/or the extent to which the written productions need to be revised (Sommers, 1980). There may be additional concerns with beginning deaf writers as the research may be biased by the fact that while composing a passage, the deaf individual may not have the capacity in working memory to mentally rehearse the writing and make appropriate revisions. Therefore, to provide *preliminary* information on the revision performance of novice hearing, or deaf, writers, it may be beneficial to have these writers perform revisions of carefully pre-planned flaws in external texts.

Hearing Students' Revision

In the seventies and early eighties, research on the revision of the hearing writer concentrated primarily on the adult or adolescent writer (Krashen, 1984). This research claimed that better writers revise more than poor writers (Stallard, 1974); student writers focus on rewording and school-learned rules (Sommers, 1980); more advanced writers focus on content in revision (Faigley & Witte, 1981); and, poor writers focus much more on form than on content in revision (Perl, 1979).

Examinations of the young hearing writer and the revision process are only now beginning to emerge. Comeau and Lehrer (1987) report that, in their study, third graders did little planning and little revising. Instead, the writing process consisted almost entirely of the translating process, or sentence generation. This finding confirms the claim by Scardamalia and Bereiter (1982) that "knowledge-telling" was the only strategy used for composing of text. Beal and Griffin (1987) found that third and fourth graders working on a word processor made very few revisions which affected the meaning of their text. Bereiter and Scardamalia (1987) asserted that young writers' problems with revision are partly due to their "lack of an executive procedure for reprocessing" (p. 791); that is, children have the separate required abilities to revise but lack the metacognitive control to tie it all together.

Atwell (1987) would not agree with this statement made by Bereiter and Scardamalia. She stated that "when students do not revise it is sometimes because they don't know how. They don't have ways they can physically

manipulate the page - to add information, delete it or move it around" (p. 131). Atwell claims that mini-lessons on revision help to eliminate this problem.

There is additional support for the idea that young children can revise effectively. Anecdotal reports from educators such as Donald Graves and Lucy McCormick Calkins (Graves, 1983, 1984) state that elementary school children who are provided enhanced writing experiences can indeed revise their writing. While Calkins (1990) has now changed some of her earlier ideas about the writing process, she did study the revision of eight-year-olds (cited in Graves, 1984) and found that "revision begins with the addition of information at the end of a child's piece (p. 149)". She proposed four categories of eight-year-old revisors, the fourth category in the heirarchy being described as follows:

> Revision results from interaction between writer and draft, internalized audience, and the evolving subject. (The child rereads) ... to see what he has said and to discover what he wants to say. There is a constant vying between intended meaning and discovered meaning, between the forward motion of making and the backward motion of assessing. (The child) can insert any information into text, make major reorganizations, line out, use symbols to manipulate information, and can see information as temporary, moving toward meaning.
>
> (Graves, 1984, p. 149)

The description of these eight-year-old writers certainly appears to refute the more traditional literature on children's revision skill. However, there are

obvious limitations with anecdotal accounts and more controlled examinations of children's revision skill must verify reports such as these.

This writer conducted developmental research on children's text revisions (Edmunds, Cameron, Linton, & Hunt, 1988). The research investigated young writers' revision skill under different treatment conditions. More specifically, the study was undertaken to determine if elementary school children revise both surface and semantic textual flaws in external texts and also, to determine if text difficulty affects revision performance. Surface level revision included changes made to correct spelling, punctuation, and capitalization. Semantic level revision included changes made to correct sentences which were out of order, information that was not consistent with the story, ambiguous, unspecified information, and new information that needed to be incorporated into the text. The study revealed that while children in grade two displayed a wide range of performance levels, overall, they revised approximately one third of both semantic and surface level flaws acceptably. At the grade-three level, performance almost doubled. Both grade four and grade five children revised approximately seventy-five percent of both types of revision, an increase of forty percent over grade two. An examination of individual revision types showed that surface revisions exhibit graded performance while acceptable semantic revisions increase sharply after grade two. Text difficulty did not play a significant role in revision performance. While the children given the simpler texts, especially ones with semantic flaws, tended to perform a larger number of acceptable revisions, this tendency was not confirmed by statistical

tests. Previous research had indicated that children do not revise effectively, but, this study did provide clear evidence that young writers can generate acceptable revisions of both semantic and surface textual flaws in an external text.

The young hearing writer, then, is able to detect a mismatch between intended and written text, able to make decisions about how to make desired changes and, in fact, can execute the desired change. However, the claims by Edmunds et al. (1988) are limited to external texts and further research is required to explore the revisions young children perform on their own texts.

Deaf Students' Writing

When considering the writing of children who have hearing losses, one must first be very aware of the challenge that language-related tasks present to these students. The prelingually deaf child, the adventitiously deaf child and the hard of hearing child experience varying degrees of sensory and oral-aural language deprivation that are reflected in their attempts to communicate. Their written productions reflect the effects of these deprivations.

Webster (1986) considered the obstacles children with hearing losses have to surmount in order to write extended sequences that culminate in a coherent passage:

> At the sound level, the key function words which enable a child to connect and extend sentences may have only weak and fleeting stress in speech: they may not be heard with a hearing loss. At the syntactic

> level, these devices are relatively late in appearing in the development of language structures, so the child's inexperience in handling more complex syntax structures will include most of these devices too. Perhaps most importantly, the child's experience of language in use does not prepare her adequately for the structures which appear in writing. (Webster, 1986, p. 188)

The prelingual deaf child, the adventitious deaf child, and the hard of hearing child can bring to the writing task only that which has been experienced of language as communication.

Early Investigations of Deaf Students' Writing

Early investigations into the writing of children with hearing losses focussed on the formal structure of written compositions (Moores, 1987). This research revealed that deaf students use relatively rigid, immature, and simple written patterns (Heider & Heider, 1940) and they lack flexibility (Walter, 1955). Cooper and Rosenstein's (1966) summary of this, and other, early research is discussed by Webster (1986) and offers a clearer picture of the grammar of deaf children's writing:

> ... deaf children use shorter and simpler sentences, with less-flexible word order. There are more 'content' words, such as nouns, verbs or adjectives, and fewer 'function' words, such as prepositions, articles and conjunctions. Deaf children tend to keep to one particular sentence pattern, such as Subject-Verb-Object, and there are many errors and non-standard usages, or 'deafisms'. (Webster, 1986, p. 185)

"Deafisms" are the characteristic errors found in the written language of the deaf which reflect a lack of mastery of the English language system on the part of these individuals. While these errors are considered an idiosyncrasy of the written productions of deaf persons, Quigley and Paul (1984) noted that "almost all of the variant structures found in the written language of deaf students are found also in the English productions of populations learning English as a second language" (p. 183). Examples of deafisms, which were identified by Kretschmer and Kretschmer (1978, p. 126-127), are presented in Appendix I. Given the appearance of these errors in the written productions of hearing individuals who are learning English as a second language, it may be misleading and inappropriate to label them as "deafisms". However, for purposes of clarity in this research, the label "deafisms" will continue to be utilized.

Recent Investigations into Deaf Children's Writing

In the past decade, there has been a paradigm shift in the study of deaf children's writing (Ewoldt, 1985; Gormley & Sarachan-Deily, 1987; Webster, 1986). As with investigations of hearing children's writing, research on deaf children's writing now concentrates not only on structure, but on semantics as well. A review of the more recent literature on deaf children's writing reveals that the primary emphasis is no longer on the lack of skills. In fact, rather than portraying a depressing picture of the deaf writer, a more positive outlook is emerging. For example, Ewoldt (1985) conducted a study of literacy development, its goal being to relate to children that writing has meaning and

purpose. Ten deaf children (aged 4.2 to 5.5 years) of deaf parents participated in a three year longtitudinal study. Some of the interesting phenomena that were observed include: (1) the children's emerging concept of story and the similarity to patterns observed in children with no hearing losses; (2) the children's awareness of organizational features in reading and writing; (3) the children's ability to rearrange parts of the language system to develop new meaning; (4) the children's expectation that marks on paper signify meaning; and, (5) the children's use of environmental print, and print in their immediate environment, to support their writing. These findings demonstrated that "the patterns and strategies observed in children without hearing impairments were present and functioning in the hearing-impaired child" (Ewoldt, 1985, p. 124). Webster's (1986) recent investigations also indicated that deaf children's language acquisition progresses in a normal pattern albeit at a very delayed rate. It is clear, then, that research which explores and characterizes the developing skills of the deaf writer fosters a more enthusiastic and positive approach. It also provides more useful information for educators who attempt to facilitate the development of writing.

Deaf Students' Revision

While there is an abundance of research on the written productions of deaf children, there have been few examinations of revision performance. In fact, the writer only found two studies which addressed revision and the deaf writer. Gormley and Sarachan-Deily (1987) reported that deaf writers make

little use of revision in their writing. They analyzed the written language samples of high school students with severe to profound hearing losses and found that final copies did not differ from first drafts. Livingston (1989) explored the revision strategies of deaf high school seniors. She reported that, after conferencing with the teacher, students' revised drafts were rated better than initial writings and that more revisions generally produced better work. The study also examined similarities and differences between the revision strategies of deaf and hearing "inexperienced" writers. Livingston selected a group of high school seniors and college freshmen as her sample of hearing "inexperienced" writers. However, recent research (Graves, 1983, 1984) provides ample support for designating elementary school children as novice writers. Perhaps comparing the revision performance of deaf inexperienced writers (adolescents) with the revision performance of elementary school children would be more appropriate.

Special Issues in Revision Research with Deaf Students

There are special issues to consider before undertaking investigations of the revision performance of deaf writers, issues which were taken into account in the present study. The first issue concerns the variability of the deaf population. "In any group of hearing-impaired children a sense of homogeneity will be largely superficial and unjustified" (Webster, 1986, p. 78). Some of the variables responsible for the heterogeneity among deaf individuals are the severity of the hearing loss, the age of onset of deafness, parents' hearing status, and mode(s) of communication utilized. These factors

have a direct influence on language experience and thus must be recognized in any examination of the writing of deaf children.

Another characteristic of the sample selected for research that must be addressed is the participants' level of writing, and, if relevant, that of the hearing comparison group. When one speaks of a beginning deaf writer, one is often referring to the deaf high school student because "by the end of their school years a large proportion of hearing-impaired adolescents will not have achieved generally accepted levels of basic literacy" (Webster, 1986, p. 94). It is important, then, to acknowledge that many very young deaf school children are in prewriting stages, while older deaf students are often novice writers. Primarily because of limited English language experiences, many older deaf students are delayed in writing development. In fact, these writers may exhibit some deviance in language due to an inability to express their cognitively advanced thoughts. This has major implications for the researcher, particularly when comparing the writing performance of deaf students with that of hearing students. As Wood, Griffiths, and Howarth (1986) so aptly stated, "chronological age is not a suitable basis for comparing the linguistic abilities or literary skills of deaf and hearing children" (p. 100). This was borne in mind in the development of the present study.

While writing levels are an important issue in revision research, so too are reading levels. The reading and writing processes cannot be separated as both are integral components of the language-learning process. It is not surprising that deaf children often have difficulties with reading in conjunction with their delayed writing development. King and Quigley (1985)

attributed deaf children's reading difficulties to an absence of the necessary language base at the time of reading instruction. "Learning to read becomes a process of experience building, cognitive development, and language learning" (p. xi). Webster (1986) notes, depending on their age and their language experiences, deaf students "may have a narrow range of vocabulary and concepts, a poor understanding of English grammar, and a limited ability to think about the language system" (p. 203). Therefore, if deaf students are presented with a revision task that requires corrections to an external text rather than to their own writing, the reading difficulty of the text must be addressed. A text with complex syntax and semantics may inhibit the student from detecting and revising textual flaws. In this study, the reading difficulty of the external texts did not meet or exceed the reading comprehension levels of the participating students.

Having considered what the deaf student brings to writing, the next critical issue is how the student responds to the revision task. Revision incorporates two basic operations: surface level revision and semantic or content level revision. In the Edmunds et al. (1988) study, surface level revision required the writer to correct spelling, punctuation, and capitalization errors. Livingston (1989) included deletions, substitutions, additions, or reorderings of specific grammatical forms that did not alter the writer's meaning (i.e., substituting pronouns for nouns) in her study of surface revisions. Deaf writers, as already mentioned, may have a limited knowledge of vocabulary and grammar; thus their surface revision performance may reflect a lack of knowledge rather than an inability to

detect textual flaws. On the other hand, there is one area of surface revision that may pose little problem to the deaf writer and that is the detection and correction of spelling errors. "The fact that they tend to rely on visual cues to recall spelling patterns aligns them with good spellers generally, since that seems to be the most successful route to good spelling" (Webster, 1986, p. 203). Therefore, surface level revisions, and in particular, revisions to correct spelling errors, were explored in the present study.

Semantic level revision performance is also influenced by what the deaf child brings to the task. Semantic level revision involves corrections that change the meaning of a text (reordering of sentences, addition of information, deletion of ambiguous text, etc...). The first step in performing such revisions is the cognitive processing of extended passages, a problem for many deaf children. Webster (1986) examined the deaf child's capacity to process sentence sequences and found that the observed problems are due in part to limited inner speech coding. He concluded that because deaf children have inner coding systems based on signs, finger-spelling, visual features, or a mixture, including sounds, they have difficulties rehearsing written material in their working memory. Deaf children may not be able to retain extended sentence sequences in their information store long enough to make sense of their meaning. This has profound implications for semantic level revision performance. Due to problems with rehearsal and feedback, semantic textual flaws embedded in long, complex passages may pose great difficulties for the deaf student. In such cases, the student's performance may not be indicative of revision skill. Therefore, in the present investigation, which did

examine semantic level revision, relatively short texts with simple sentences were utilized

Obviously, then, there are special issues to consider when undertaking examinations of the deaf student's revision performance. The present research recognized these critical issues and attempted to control for those variables which may prevent the participants' actual revision skill from being realized.

The Present Study

The focus of the present study is on the revision performance of deaf students at higher elementary, junior and senior high school and post secondary levels. The students were expected to be language delayed and, therefore, despite their ages, were considered beginning, or novice, writers. This writer concurs with recent researchers (Ewoldt, 1985; Webster, 1986) who claim that the language delay exhibited by deaf students is not characterized by abnormal developmental patterns. Therefore, when considered as beginning writers, these deaf adolescents should perform as one would expect a novice to do, making acceptable revisions in simple external texts.

The heterogeneity of the deaf population was also recognized and thus personal and educational information regarding each participating student was collected. A questionnaire was distributed to the students' teachers to ascertain the approach to language, and more specifically, revision instruction within the classroom. As well, the Raven's Standard Progressive Matrices (1983) was administered to each student to determine his or her

intellectual capacity. Raven's SPM is a non-verbal measure of ability which has previously been used with deaf students (Raven, Court, & Raven, 1983; Wood, Wood, Griffiths & Howarth, 1986).

As in the Edmunds et al. (1988) study, the focus of this research was on revisions made to external texts. As mentioned earlier, investigations of revision performance often examine the revisions writers make to their own texts and there are factors which may bias this type of research. Presenting deaf students with simple standard texts which have carefully pre-planned textual flaws controls for these biases and may provide the students with a revision task which they find easier, thus facilitating optimal revision performance.

The researcher expected that there would be a significant difference in revision performance across age. While deaf students are delayed in writing development, it was expected that, with literary experience, skills are enhanced. Older students should be more familiar with school-learned grammar rules and have had more opportunities to manipulate texts. Therefore, it was hypothesized that the more experienced writers (the older students) would perform significantly more acceptable revisions.

It was also expected that a positive relationship would exist between the students' revision performance and their performance on the reading comprehension subtest of the Canadian Achievement Tests (1982). Those individuals with superior reading comprehension levels, should perform more acceptable revisions, especially semantic revisions, as they require higher levels of semantic processing.

Statement of Hypotheses

The following hypotheses were derived from the literature review:

Hypothesis I

Deaf writers aged 15-20 will perform significantly more acceptable revisions than deaf writers aged 10-14.

Hypothesis II

There will be a significant positive relationship between the deaf students' revision performance and their reading comprehension levels.

CHAPTER III

METHOD AND DESIGN

In this chapter, information pertaining to the subjects, instruments, data collection, and data analysis is presented.

Subjects

Twenty-nine deaf students, ranging from age ten to age twenty, from various educational settings in a western Canadian province participated in the study. There were thirteen students in the 10-14 year age group and sixteen students in the 15-20 year age group. All twenty-nine subjects completed all experimental tasks. Each of these students met the following criteria: 1) a minimum hearing loss of 70 dB; 2) no gross additional difficulties which impair learning (teacher and/or school jurisdiction identified); and, 3) a minimum grade three reading level. Approximately 90 students were identified but only those students who elected to take part in the study and whose parents or guardians completed consent forms were included in the research. Appendix II gives examples of these consent forms. Several complicating factors were assumed to be the reason that only one third of those students approached by the researcher agreed to participate in the study. These factors include: 1) the high number of past research projects which focussed on this population; and, 2) the possibility that deaf students and/or guardians may now be more assertive regarding their participation in testing situations.

Personal information regarding each individual student was collected. The personal information included gender, birthdate, average hearing loss in dB in the better ear for the most important frequencies for the reception of speech (500, 1,000 and 2,000 Hz), age of onset of the hearing loss, and the hearing status of family members. Information regarding socio-economic status was requested on the parental consent forms but there were not sufficient responses to include this data. Educational information, including type of school setting and primary mode(s) of communication, was also gathered. The information sheets containing the data were numerically coded to protect the anonymity of the students. The following tables summarize this data:

Table 1

Subject Information for Group A

Subject ID	Gender	Age	Hearing Loss*	Family Status	Communication	Setting
1	F	10-8	101 post	hearing	oral	public-elem
2	M	12-7	115 pre	hearing	oral/manual	public-elem
3	M	14-1	73 pre	hearing	oral	public-jrhigh
4	M	14-2	95 pre	hearing	manual	deaf-jrhigh
5	M	13-6	80 pre	deaf	manual	deaf-jrhigh
6	M	12-1	102 pre	deaf	manual	deaf-elem
7	M	12-9	102 pre	hearing	manual	deaf-elem
8	F	12-4	117 pre	deaf/hear	manual	deaf-elem
9	F	12-1	97 pre	hearing	manual	deaf-elem
10	M	11-5	70 pre	hearing	oral	public-elem
11	F	11-10	78 post	deaf/hear	oral	public-elem
12	M	10-9	82 pre	hearing	oral	public-elem
13	M	13-5	95 pre	hearing	oral	public-jrhigh

* Hearing loss refers to the average hearing loss in dB in the better ear for the most important frequencies for the reception of speech (500, 1,000 and 2,000 Hz). "Post" indicates a post-lingual hearing loss while "pre" indicates a pre-lingual hearing loss.

Table 2

Subject Information for Group B

Subject ID	Gender	Age	Hearing Loss	Family Status	Communication	Setting
1	M	18-5	87 pre	hearing	oral/manual	upgrading
2	F	19-9	70 pre	hearing	oral	university
3	F	17-0	110 pre	hearing	oral	public-srhigh
4	M	19-0	100 pre	hearing	oral	technical
5	F	20-2	100 pre	hearing	oral/manual	technical
6	M	16-5	105 pre	hearing	manual	deaf-srhigh
7	M	19-1	110 pre	hearing	manual	deaf-srhigh
8	M	18-1	95 pre	deaf/hear	manual	deaf-srhigh
9	F	15-3	98 pre	hearing	manual	deaf-srhigh
10	M	16-3	90 pre	hearing	manual	deaf-srhigh
11	F	19-6	95 pre	deaf/hear	oral	public-srhigh
12	F	17-11	80 post	hearing	oral	public-srhigh
13	M	15-7	75 pre	hearing	oral	public-srhigh
14	M	19-3	70 pre	hearing	oral	public-srhigh
15	M	16-3	75 pre	hearing	oral	public-srhigh
16	F	17-8	95 pre	hearing	oral	public-srhigh

Table 1 Summary

4 females and 9 males
Ages range from 10-8 to 14-2
Mean age = 12-4
Hearing loss range: 70 to 117
Mean hearing loss = 93 dB

Table 2 Summary

7 females and 9 males
Ages range from 15-3 to 20-2
Mean age = 17-9
Hearing loss range: 70 to 110
Mean hearing loss = 91 dB

Instruments

Revision Tasks:

Four texts written by the researcher were utilized for the revision tasks. All four are scriptal representations (Nelson, 1979) of events common in the experience of deaf children. Text difficulty was determined by the Spache (1966) readability index. The students' copies of the texts were computer-printed and triple-spaced. The following types of textual flaws are included in the texts:

(1) *Semantic level errors* include sentences that are out of order, information that is not consistent with the passage, and ambiguous information.

(2) *Surface level errors* include incorrect spelling, missing punctuation, missing capitalization, and incorrect usage of capitalization.

(3) *Deafisms* include *be* deletion, conjunction deletion, negative outside the sentence, incorrectly inflected infinitive, and infinitive in place of gerund.

The text "My School Day" (reading difficulty 2.5) was the focus of the students' training session (Appendix IV). The text contains semantic level errors, surface level errors, and deafisms. The three remaining texts were presented to the students in the treatment phase of the study. All three texts are titled "How I Talk on the Telephone" (reading difficulty 2.1) and differ only in the type of revision called for: Text 1 requires 5 semantic level revisions, Text 2 requires 10 surface level revisions and Text 3 requires 6 revisions to correct deafisms (Appendix V). The types of textual flaws were separated in the treatment texts to control for the effects of students focussing on one type

of flaw (i.e., surface level errors) and to promote the saliency of the errors by limiting the number of flaws per text.

Canadian Achievement Tests:

The Canadian Achievement Tests (1982), based on the California Achievement Tests, were normed on students across three separate regions in Canada. Many original test items from the California Achievement Tests were revised or deleted as new items were selected to reflect Canadian content.

The reading comprehension subtest of the Canadian Achievement Tests determines subjects' reading comprehension levels. The subtest is divided into literal, interpretive, and critical comprehension. Each type of comprehension is measured with multiple-choice questions based on several reading selections.

Reliability of the Canadian Achievement Tests was determined using the Kuder-Richardson formula 20 (KR 20). This formula estimated the consistency of performance from item to item. For the reading comprehension subtest, a range of KR 20 values are presented for each test level as a KR 20 value was computed for each of the three types of comprehension. The lowest range of values is .34 - .49 for test level 18 and the highest range of values is .67 - .75 for test level 12. While the technical manual of the CAT (1983) promised test-retest reliability information, the experimenter was unable to obtain this data.

The validity of the Canadian Achievement Tests is presented in terms of intercorrelation coefficients. The intercorrelation coefficients for the reading comprehension subtest compared to the total test score on the

Canadian Achievement Tests range from .84 to .89 depending on the test level. For further information on both the relability and validity of the CAT, refer to the Canadian Achievement Tests technical manual (1983).

The scoring of the reading comprehension subtest involves tallying the total number of correct responses. This total score is translated into a grade equivalent according to tables provided by the test.

Raven's Standard Progressive Matrices:

The Raven's Standard Progressive Matrices (SPM) (1983) were designed to provide "a test suitable for comparing people with respect to their immediate capacities for observation and clear thinking" (Raven et al., 1983, p. 2). The SPM is a non-verbal test which requires the test-taker to observe 60 figures that have missing segments and to choose one of six sample segments which completes each figure. The test-taker does not have to respond verbally as the choice can be indicated by gesture. The problems become increasingly more difficult as the test progresses. Raven et al. (1983) state that the SPM is a good measure of general intellectual ability, "with relatively little influence from the cultural environment in which the individual grew up or his education" (p. 3).

The established re-test reliability of the Progressive Matrices ranges from .83 to .93. "In general, the re-test reliablity tends to be lowest of all with very young children and very old people" (Raven et al., 1983, p. 4). The internal consistency, determined by employing the split-half method, is reported to be .90.

The concurrent validity of the Raven's Standard Progressive Matrices was established using the Binet and Weschler instruments. Over several different studies, the concurrent validity ranged from .54 to .86.

For each subject the total number of correct responses is calculated. These scores can then be related to the norms and the subject's intellectual ability rated on a percentile basis or in Grades from I down to V. However, for the purposes of this investigation, the scale was inverted thus making a high numerical number indicate more correct responses. The use of plus and minus signs was eliminated and converted numerically to allow for statistical analysis. The following Table shows how this was achieved:

Table 3

The Raven and Converted Grades for the Raven's Standard Progressive Matrices

Raven Grades	Converted Grades
I	8
II+	7
II	6
III+	5
III-	4
IV	3
IV-	2
V	1

This scoring system facilitated the comparison of Raven scores with subjects' performances on other measures.

Teacher Questionnaire:

This instrument was presented to homeroom and/or English teachers of all participating students and included questions concerning the teacher's approach to language instruction within the classroom. There were specific questions regarding writing and revision. See Appendix III. This information was collected to aid in the interpretation of any specific unexplained results. The teacher questionnaire was completed for 16 of the 29 students. One student was attending university so the questionnaire was not appropriate. The twelve remaining questionnaires were not returned to the researcher. This poor response rate may be due to time constraints of teachers.

Data Collection

Personal and educational information was obtained through parents and school records. Teachers of participating students completed the Teacher Questionnaire during or after the students' participation in the study.

The experimenter met with each subject, either individually or within small groups, for approximately 90 minutes, with the exception of those students who had current Canadian Achievement Tests scores in their school files. Approximately 60 minutes were spent with these subjects. The 90 minute session was divided into two parts. In most cases, both parts were conducted on the same day, however, in some schools there were time constraints which

meant that the two parts had to be conducted on different days. The reading comprehension subtest of the Canadian Achievement Tests and the Raven's Standard Progressive Matrices were both administered in the first meeting with subjects. During the second meeting, the revision tasks were introduced.

The training session began with each student receiving a computer-printed text entitled "My School Day". The instructor had a larger copy of the same text taped on the board at the front of the room. The students were informed that the text was a possible submission to a school newspaper and they were going to practice being newspaper editors. The following instructions were given orally, manually and in written format:

> Today we are going to be newspaper editors. An editor is a person who makes sure a story is ready to be put in a newspaper. When someone has written a story to put in the newspaper, it is the editor's job to make sure that the story will make sense to the person who reads the newspaper. The editor has to fix any problems he or she finds in the story before it is typed and printed in the newspaper. Let's pretend this story has been sent in to our newspaper. You have a copy of this same story on your desk. It has some problems that need to be fixed. We will go through it together and get the story ready to be printed.

The subjects, under the guidance of the instructor, then proceeded to detect and diagnose the textual flaws evident in "My School Day". First, the students were instructed to read the entire text silently. Then the instructor asked the subjects to read the opening sentence. The subjects were asked if there were any problems with this particular sentence. Once a problem was detected, the

instructor asked for suggestions on how to fix the textual flaw. All acceptable revisions were acknowledged and the instructor demonstrated how to indicate these revisions on her larger version of the text. The subjects then marked their own copy of the text using red editing pencils. After each sentence in the text had been read and, if necessary, revised, the instructor had the students reread the entire passage to be certain they were satisfied with the revised edition. If they felt their editing job was complete, they were asked to sign their name in a space marked "editor".

The treatment phase of the study began with the following instructions being given orally by the instructor, signed by the interpreter and provided in written format:

> Now that you have practiced being an editor, I would like you to try editing some stories by yourself. These stories have some problems, too. Remember to follow the steps we used when we fixed the problems in the first story: (1) read all of the story; (2) read each sentence and fix any problems you find; (3) read the whole story again and make sure it makes sense; and (4) put your name in the space marked "editor" to show that you are finished fixing the story.

The students were then given the three texts, entitled "How I Talk on the Telephone", one at a time, to revise. Texts 2 and 3 were presented as follows:

> This story is like the last one you did but this time the writer made some different mistakes. Fix all the problems you can find. Remember to sign your name when you are finished fixing the story.

Analysis of Data

Administration of the above mentioned instruments produced the following scores for each subject: (1) number of semantic level flaws revised acceptably; (2) number of surface level flaws revised acceptably; (3) number of deafisms revised acceptably; (4) a Raven's Standard Progressive Matrices score; and, (5) a reading comprehension level score. Using StatView II (1987), revision scores were examined by one-way analysis of variance ($p = .05$) to determine if there were significant differences between the performance of the younger deaf students (aged 10-14) and that of older deaf students (aged 15 and older). A Pearson product-moment correlations (r) matrix was calculated to indicate the relationship between revision performance and reading comprehension levels. As well, descriptive information was compiled regarding the students' overall revision performance.

CHAPTER IV
RESULTS

In this chapter, the results of the study are presented. Findings regarding the two hypotheses are addressed first and then the overall revision performance of the students is discussed descriptively. Lastly, subsidiary analyses and responses to the teacher questionnaire are reported.

Hypothesis 1

Deaf writers aged 15-20 will perform significantly more acceptable revisions than deaf writers aged 10-14.

Results

When the data were grouped into the two designated age ranges, it was revealed that surface and semantic level flaws as well as deafisms were revised by students in both age groups. The following table presents both the means and percentages of textual flaws revised within the two groups:

Table 4

Mean Number of Textual Flaws Revised Acceptably with Percentages in Parentheses

Text	Age Group		
	10-14 years	15-20 years	
Text 1*	2.39	3.38	$p > .05$
Semantic Revision	(48%)	(68%)	
Text 2 **	7.31	8.75	$p < .05$
Surface Revision	(73%)	(88%)	
Text 3 ***	3.31	4.31	$p > .05$
Revision of Deafisms	(55%)	(72%)	

* 5 textual flaws

** 10 textual flaws

*** 6 textual flaws

Analysis

Analyses of variance revealed that the 15-20 year age group performed at a significantly higher level on surface level revisions than did the 10-14 year age group, $F(1, 27) = 5.05$, $p < .05$. The analyses also revealed that the higher level of performance displayed by the older students approached, but did not reach, significance for semantic level revisions and revisions to deafisms.

Conclusion

Hypothesis I was accepted. Deaf writers aged 15-20 performed significantly more acceptable surface level revisions than deaf writers aged 10-14. However, the older students did not perform significantly more acceptable semantic level revisions or revisions to deafisms.

Hypothesis II

There will be a significant positive relationship between the deaf students' revision performance and their reading comprehension levels.

Results

Pearson product-moment correlation coefficients were calculated to examine the relationship between revision performance and reading comprehension levels, as measured by the CAT. The results appear in the following table:

Table 5

Pearson Correlation Coefficients

	Reading Comprehension Level
Semantic Revision	.36 $p < .05$
Surface Revision	.29 $p > .05$
Revisions to Deafisms	.62 $p < .01$

Conclusion

Hypothesis II was accepted. There is a significant positive relationship between the deaf students' revision performance and their reading comprehension levels. However, this significant correlation was only found with semantic level revisions and revisions to deafisms. Performance on surface level revisions did not correlate significantly with reading comprehension levels.

Overall Revision Performance

Calculation of the students' revisions on the training text ("My School Day") revealed a high percentage of surface level textual flaws, semantic level textual flaws and deafisms revised acceptably. For both age groups together,

the overall performance was approximately 95 percent with no particular flaw causing difficulty.

The treatment phase data were analyzed for the percentage of acceptable revisions overall as well; 58 percent of semantic flaws, 81 percent of surface flaws and 64 percent of deafisms were revised acceptably. Table 6 breaks this down further by displaying the percentage of particular error types that were revised acceptably.

Table 6

Percentage of Various Error Types Revised Acceptably

Category	Error Type	% Revised Acceptably
Semantic	Information that does not belong	73
Semantic	Ambiguous information	34
Semantic	Incorrect sequence	34
Surface	Spelling	88
Surface	Punctuation	70
Surface	Capitalization	83
Deafism	*Be* deletion	74
Deafism	Contraction deletion	51
Deafism	Negative outside sentence	82
Deafism	Incorrectly inflected infinitive	65
Deafism	Infinitive in place of gerund	37

A number of the flaws were detected by the students but their attempts to revise the error were unacceptable. The following table outlines the

percentage of attempted, but unsuccessful, revisions evident for each of the three tasks:

Table 7

Percentage of Attempted but Unacceptable Revisions

Task	Attempted, but Unacceptable Revisions
Semantic Revisions	9%
Surface Revisions	2%
Deafisms	10%

Subsidiary Analyses

Recognizing the heterogeneity of deaf students, subsidiary analyses were conducted to determine the effect other variables may have had on revision performance.

Reading Comprehension Levels:

Canadian Achievement Tests (1982) scores were tabulated and means and standard deviations for the two age groups were determined. Table 8 shows these results:

Table 8

Means and Standard Deviations of Students' Performance on the Canadian Achievement Tests (CAT)

Instrument		Age Group 10-14 years	Age Group 15-20 years
CAT	M	5.64	7.20
	SD	2.71	3.85

An analysis of variance revealed that there was no significant difference between the two groups' performance on the reading comprehension subtest of the CAT.

When the groups were examined for deviant scores, it was found that the younger group did have two exceptional scores (grade equivalencies of 10.6 and 11.5). When these scores were removed, the mean reading comprehension score for the younger group became 4.65. An analysis of variance now revealed a significant difference between the two groups' performance, $F(1, 25) = 15.66$, $p < .05$.

Intellectual Ability:

Raven's Standard Progressive Matrices scores were also tabulated and means and standard deviations for the two age groups were determined. The results are shown in Table 9:

Table 9

Means and Standard Deviations of Students' Performance on the Raven's Standard Progressive Matrices (SPM)

Instrument		Age Group 10-14 years	Age Group 15-20 years
SPM	M	4.92	6.12
	SD	1.38	1.50

An analysis of variance revealed that older students had significantly higher SPM scores than did younger students, $F(1,27) = 4.94$, $p < .05$.

Pearson product-moment correlation coefficients were calculated to examine the relationship between revision performance and Raven's SPM scores. As with the relationship between revision performance and reading comprehension levels (see Table 5), significant correlations were established between intellectual ability and both semantic level revisions ($r = .59$, $p < .01$) and revisions to deafisms ($r = .37$, $p < .05$). Performance on surface level revisions did not correlate significantly with intellectual ability.

Reading Comprehension Levels and Intellectual Ability:

When the CAT and SPM scores for the total groups were considered, a significant correlation was shown to exist between reading comprehension levels and intellectual ability ($r = .41$, $p < .05$).

Hearing Loss:

All subjects in this study had a hearing loss in excess of 70 dB in the better ear based on a pure tone average of 500, 1000 and 2000 Hertz. Hearing losses ranged from 70 dB to 117 dB. Ranges and means of hearing losses for each group are shown in Table 10.

Table 10

Ranges and Means of Hearing Losses

Group	Range	Mean
10-14 yr olds	70 dB - 117 dB	93 dB
15-20 yr olds	70 dB - 110 dB	91 dB

An analysis of variance was conducted to determine whether a significant difference existed between the hearing losses of the two groups. This analysis indicated that there was no significant difference.

Pearson product moment correlation coefficients were calculated to examine the relationships between students' hearing losses and their performance on the revision tasks, the measure of intellectual ability (SPM) and the measure of reading comprehension (CAT). No significant correlations were found.

Age of Onset of Hearing Loss:

Only three of the twenty-nine subjects experienced their hearing loss after the age of two years. The remaining subjects were born with a hearing

loss and thus are termed prelingual, indicating that their loss occurred before the acquisition of speech and language. Pearson product-moment correlation coefficients were calculated to examine the relationship of the age of onset of the students' hearing loss and the students' performance on the revision tasks, the measure of reading comprehension (CAT) and the measure of intellectual ability (SPM). The age of onset of the students' hearing loss did not correlate significantly with their performance on any tasks.

Educational Setting:

Analyses were conducted to determine if the type of educational setting had any influence on students' performance. The two settings were classified as *school for the deaf* where manual communication is primarily used and *public school* where oral communication is emphasized. The analyses of variance revealed that those students in the school for the deaf had a significantly greater hearing loss, $F(1,27) = 5.78$, $p < .05$, while the students attending public school performed at a significantly higher level on the SPM, the CAT and on semantic level revisions [SPM, $F(1,27) = 6.54$, $p < .05$; CAT, $F(1,27) = 6.31$, $p < .05$; semantics, $F(1,27) = 16.5$, $p < .01$].

Gender:

Analyses were conducted to determine if differences existed between males and females for the variables of revision performance, reading comprehension levels and intellectual ability. An analysis of variance

conducted for each variable showed no significant differences between the performance of males and females.

Teacher Questionnaire

The responses to the sixteen teacher questionnaires completed revealed that seven students are experiencing a highly structured approach to language arts, six are participating in a "whole language" classroom and three students experience a combination of the two teaching methods. All teachers reported that they encourage the revision/editing of students' written productions. Twelve of the teachers stated that revision skill is formally taught in their classroom.

Summary

A summary of the primary findings of the study are shown in Table 11.

Table 11

Summary of Significant Research Findings

Variables	Findings
Revision Performance/Age	Older deaf students performed significantly more acceptable surface level revisions than younger deaf students.
General Intellectual Ability/Age	The group of older students had significantly higher SPM scores than did the younger group of students.

Revision Performance/Reading Comprehension Levels	There was a significant positive relationship between students' performance of semantic level revisions, and revisions to deafisms, and their performance on the reading comprehension subtest of the Canadian Achievement Tests.
Revision Performance/General Intellectual Ability	There was a significant positive relationship between students' performance of semantic level revisions, and revisions to deafisms, and their performance on the Raven's SPM.
Reading Comprehension Levels/ General Intellectual Ability	There was a significant correlation between student's performance on the CAT and their performance on Raven's SPM.
Hearing Loss/Educational Setting	Students who attended a school for the deaf had a significantly greater hearing loss than students who attended a public school.
Educational Setting/Revision Performance	Students who attended a public school performed significantly more acceptable semantic level revisions than students who attended a school for the deaf.
Educational Setting/Reading Comprehension Levels	Students who attended a public school performed at a significantly higher level on the CAT than did students who attended a school for the deaf.
Educational Setting/General Intellectual Ability	Students who attended a public school performed at a significantly higher level on Raven's SPM than did students who attended a school for the deaf.

In this chapter the results of the study have been presented. A discussion of these findings follows in Chapter V.

CHAPTER V
DISCUSSION

The present study was undertaken to examine the revision performance of two groups of deaf students who attended educational institutions in a western Canadian province and to explore the relationship between revision performance and reading comprehension levels. This chapter begins with a discussion of the results for both hypotheses. The writer also addresses the students' overall revision performance and comments on the findings regarding the variables of reading ability, intellectual ability, educational setting, hearing loss, age of onset of hearing loss, and gender. Next, limitations and implications of the study are discussed. To conclude the chapter, suggestions are provided for further research.

Hypothesis I

As proposed in Hypothesis I, the older deaf students performed a greater number of acceptable revisions than did the younger deaf students. More specifically, the older writers corrected a significantly greater number of surface level flaws. Also, the older students tended to correct a larger number of acceptable semantic revisions, and revisions to deafisms, although these tendencies were not statistically significant. This higher level of revision performance by the older students cannot be attributed entirely to revision skill development as the data analyses revealed that the 15-20 year age group performed significantly higher on the measure of general ability (SPM) than

did the younger group. However, since students with higher SPM scores performed a greater number of both semantic revisions and revisions of deafisms, but not a significantly greater number of surface level revisions, it is apparent that the differences in performance of the two age groups may be, in part, attributed to revision skill development.

Hypothesis II

As hypothesized in the early stages of the research, the subjects' revision performance correlated significantly with their scores on the reading comprehension subtest of the Canadian Achievement Tests (1982). Those students with superior reading comprehension abilities performed well on the types of revision that require higher levels of semantic processing (semantic level revisions and revisions to deafisms). However, those students with superior reading comprehension abilities did not necessarily perform well on surface level revisions. Perhaps the detection and correction of surface level errors is more dependent on school-learned rules than reading ability.

It is important that researchers and educators recognize the interrelatedness of the reading and writing processes, particularly when considering students' semantic level revision performance. While the skills necessary to revise surface level flaws may be acquired as students progress through each grade level, the skills necessary to effectively revise semantic level flaws may be best acquired in conjunction with the acquisition of reading skills.

Overall Revision Performance

This examination of the revision performance of novice deaf writers provides clear evidence that these students can successfully revise semantic and surface textual flaws as well as deafisms. On the particular revision tasks in this study, writers aged 10-14 revised approximately one half of both semantic level flaws and deafisms, and three quarters of the surface level flaws. Writers aged 15-20 revised approximately two thirds of semantic level flaws and three quarters of the deafisms while a ceiling was reached on the revision of surface level flaws.

It is interesting to note the types of textual flaws which these deaf students were most, and least, successful in revising. When the text required semantic level revisions, the students were quite competent in removing information that was inconsistent with the passage. They were not as successful when the textual error involved clarifying ambiguous statements or when they were required to correct the sequence of the passage. Perhaps these latter two textual errors were not as salient as the inconsistent information. In an attempt to interpret basic meaning, deaf students may not be inhibited by ambiguous statements and incorrect sequencing. However, extraneous, or inconsistent, information may not be so easily incorporated into the basic meaning of the text and therefore, the error is more obvious to the students. As well, reading comprehension may be much more critical to the detection of these particular types of errors. Perhaps it is the case that the constraints of the working memory of deaf individuals, as described by Webster (1986), come into play here. If the students had difficulty storing

information from the passage, and thus read the story in a sentence-by-sentence fashion, the ambiguous statements and the incorrect sequencing of the passage would have been difficult to detect.

In the text requiring surface level revisions, the students exhibited competence in detecting and revising spelling errors, as was predicted. This supports Webster's (1986) statement that deaf students rely on visual cues to recall spelling patterns thus aligning them with good spellers. The students also had no difficulty with punctuation or capitalization. In fact, surface level flaws were handled very well by the majority of these deaf writers. As Sommers (1980) reported, student writers focus on school-learned rules when revising and as school-learned rules usually refer to surface level revisions, this may be an area where the deaf students have had considerable experience.

In the text which contained deafisms, the students were successful in revising the negative outside the sentence and the *be* deletions. They were relatively successful in correcting the contraction deletion and the incorrectly inflected infinitive but had difficulty revising the infinitive in place of the gerund. This may be an area for further practice and classroom instruction as these types of errors are often evident in the writing of deaf students (Kretschmer & Kretschmer, 1978).

In fact, perhaps educators should place increased emphasis on semantic revisions and revisions to deafisms. According to Table 7, in Chapter IV, approximately ten percent of both semantic flaws and deafisms were detected but not successfully revised. Since students are detecting some of these textual

flaws, it would appear that they are developmentally ready to acquire the skills necessary to perform the acceptable revisions. As educators observe the revision performance of individual students, they will be aware of those types of revision skills each student is ready to acquire.

Returning to the revision performance of novice hearing writers as reported by Edmunds et al. (1988), while this present study was limited by the number of participants, there is some indication that beginning deaf writers exhibit patterns of revision skill development similar to those found with their hearing counterparts. As with the hearing students in the Edmunds study, the deaf students' performance of surface revisions increased moderately over age while their performance of semantic revisions increased more markedly. This comparison of the revision skill development of novice deaf writers with novice hearing writers must be explored further before any conclusions are reached, however, it does appear that there may be support for the contention that deaf individuals are simply delayed, and not deviant, in language development (Ewoldt, 1985; Webster, 1986).

Subsidiary Analyses

Reading Comprehension Levels:

Johnson et al. (1989) reported that the average deaf high school graduate attained reading levels comparable to the hearing third or fourth grader. In this study, the mean reading score for the younger students was 5.6. Even after two exceptionally high scores were removed, the mean reading

score remained greater than 4.0. The mean reading score for the older students was 7.20, much higher than the mean for the younger students and higher than would be expected given the comments made by Johnson and his colleagues. These results indicate that some deaf children do indeed achieve reading comprehension levels above the grade four level commonly given.

Intellectual Ability:

Analysis of intellectual ability scores, obtained from the Raven's Standard Progressive Matrices (1983), indicated a significant difference in scores between the two groups. The older deaf students had significantly higher scores than did the younger students. In fact, further analysis revealed that those students with higher scores on the SPM also scored high on the reading and revision tasks. These results do not support those of Wood et al. (1986) who investigated the linguistic abilities of severely and profoundly deaf children. They found "no evidence that intelligence (as assessed by the Raven's Standard Progressive Matrices)... contributed to success on linguistic measures" (p. 118). While the findings of the present study are tentative due to the limited number of subjects, there is a suggestion that intelligence may contribute to success on some linguistic measures.

Educational Setting:

The subsidiary analyses revealed thought-provoking information regarding the educational setting experienced by the participating students. Not surprisingly, the students attending a school for the deaf had a

significantly higher degree of hearing loss than those students attending a public school. The interesting observation was that the students in this study who attend public school performed significantly higher on the measure of general intellectual ability (SPM) and the measure of reading comprehension (CAT). These students also made significantly more acceptable semantic revisions than did the students attending a school for the deaf. These findings raise many questions regarding the effects of hearing losses, the placement of children in particular school settings and the type of school experiences provided in different settings. While these are familiar issues within deaf education, perhaps more research regarding the language skill development of students in both settings will shed some light on these age-old questions.

Hearing Loss, Age of Onset of Hearing Loss and Gender:

The subsidiary analyses further indicated that the variables of hearing loss, age of onset of hearing loss and gender did not appear to influence performance on any tasks. It may be somewhat surprising that the students' degree of hearing loss does not correlate with their performance on language-related tasks. However, since all of the subjects in this study were severely to profoundly deaf, the range of their hearing losses may not be substantial enough to result in significant differences in their linguistic skills. As well, the evidence cannot be conclusive regarding the effects of the age of onset of hearing loss on language-related tasks because of the limited number of participants in the present study.

Teacher Questionnaire

While a limited number of teachers responded to the teacher questionnaire, it is interesting to note that the deaf students in this study experience very different language arts instruction. Perhaps even more interesting is the fact that all teachers reported that they encourage revision of students' written productions and twelve teachers reported that they formally teach revision skills in the classroom. Unfortunately, none of these teachers elaborated on their revision instruction methodology. As well, there is a lack of information on any previous revision instruction experienced by these students. A more in-depth investigation of what is presently occurring in the classroom, and its effectiveness, is crucial to the development of teaching strategies that may facilitate deaf writers' revision skill development.

Limitations and Implications

There are two limitations evident in this research. Firstly, there were a limited number of subjects who participated in the study. While approximately ninety students were identified as potential subjects, consent forms were obtained for only twenty-nine individuals. Given the low number of participating students, results from the study must be considered tentative. The second limitation to the study is that the students' performance is based solely on revisions made to external texts. While the subjects' revision performance revealed that they can detect and revise textual errors, these findings cannot be generalized to the students' revision of their own writing.

The revision performance of the students in this study has serious implications for both our understanding of the development of communication skills of deaf writers and our strategies for the implementation of writing curricula for the deaf. The present research suggests that deaf writers do develop revision skills with age, and, in fact, while this development may be delayed, it does not appear to be deviant. Educators of the deaf must recognize the strengths and weaknesses of deaf writers, particularly in the area of revision. In the present study deaf students exhibited an ability to detect and revise surface level flaws effectively, however, there were difficulties with semantic level revisions and revisions to deafisms. Educators must be aware of each writers' level of revision skill with these three types of textual flaws and subsequently facilitate the acquisition of new skills. Perhaps implementing mini revision lessons, as suggested by Atwell (1989), involving tasks similar to those used in this study would be one method of helping students to become more proficient revisors.

Further Research

The results of this study highlight three important areas that should be considered for further research. First, the present study could be replicated with a larger sample, a sample which would include deaf students from a diverse geographic area. Secondly, there is an obvious need for research which focusses on the revisions deaf students make to their own writing. For instance, a measure of revision performance before and after the implementation of specific revision skill instruction would provide important

information for educators. Lastly, to examine the contention that deaf students are delayed, and not deviant in their acquisition of writing skills, a study could be designed to compare the revision performance of hearing elementary school aged writers and adolescent deaf writers.

Summary

The present study examined the revision performance of two groups of deaf students and explored the relationship between revision performance and reading comprehension levels. The results suggest that older deaf students (aged 15-20) revise flaws in an external text more effectively than younger deaf students (aged 10-14). Generally, deaf writers who have a higher level of reading ability, and perform at a higher level on a measure of intellectual ability, seem to be most successful at revising semantic textual flaws and deafisms. The degree of reading ability and intellectual ability do not appear to be related to the effective revision of surface level flaws. While these findings only begin to provide preliminary information regarding the revision performance of deaf writers, there is evidence that beginning deaf writers are indeed developing revision skills. Further enhancement of these skills may play a critical role in helping these writers become more competent users of written English.

REFERENCES

Abacus Concepts. (1987). StatView II. Berkely, CA: Abacus Concepts, Inc.

Atwell, N. (1987). In the middle: Writing, reading and learning with adolescents. New Hampshire: Heinemann Educational Books.

Beal, C.R., & Griffin, E.A. (1987). Learning to use a text editor. Presented at the Annual Meeting of the American Educational Research Association, April 1987, Washington, DC.

Bereiter, C., & Scardamalia, M. (1987). The psychology of written composition. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Calkins, L. (1991). Living between the lines. Toronto, Canada: Irwin Publishing.

Canadian Achievement Tests (1982). Scarborough, Ontario: Canadian Test Centre/McGraw-Hill Ryerson.

Comeau, M., & Lehrer, R. (1987). The mind of a writer: A cognitive model of computer-assisted composition. Paper presented at Annual Meeting of American Educational Research Association, April, 1987, Washington, DC.

Cooper, R., & Rosenstein, J. (1966). Language acquisition of deaf children. The Volta Review, 68, 58-67.

D'Arcy, P. (1989). Making sense, shaping meaning. New Hampshire: Boynton/Cook Publishers, Heinemann.

Edmunds, G., Cameron, C., Linton, M., & Hunt, A. (1988). Children's text revisions. Poster presented at the Annual Meeting of the Canadian Psychological Association, June 1988, Montreal, PQ.

Ewoldt, C. (1985). A descriptive study of the developing literacy of young hearing-impaired children. The Volta Review, 87 (5), 109-126.

Faigley, L., & Witte, S. (1981). Analyzing revision. College Composition and Communication, 32, 400-414.

Fitzgerald, J., & Markham, L.R. (1987). Teaching children about revision in writing. Cognition and Instruction, 4 (1), 3-24.

Gormley, K., & Sarachan-Deily, A.B. (1987). Evaluating hearing-impaired students' writing: A practical approach. The Volta Review, 89 (3),157-169.

Graves, D.H. (1983). Writing: Teachers and children at work. New Hampshire: Heinemann Educational Books.

Graves, D.H. (1984). A researcher learns to write. New Hampshire: Heinemann Educational Books.

Hayes, J., & Flower, L. (1980). Identifying the organization of writing processes. In Lee Gregg and Erwin Steenberg (Eds.) Cognitive Processes in Writing: An Interdisciplinary Approach. Hillsdale, New Jersey: Erlbaum.

Hayes, J., & Flower, L. (1986). Writing research and the writer. American Psychologist, 41 (10), 1106-1113.

Heider, F., & Heider, G. (1940). A comparison of sentence structure of deaf and hearing children. Psychological Monographs, 52, 1 (Whole No. 232), 42-103.

Johnson, R.E., Liddell, S,K, & Erting, C. J. (1989). Unlocking the curriculum: Principles for achieving access in deaf education. Gallaudet Research Institute Working Paper 89-3. Washington, D.C.: Gallaudet University.

Krashen, S.D. (1984). Writing: Research, theory and applications. Oxford: Pergamon Press Ltd.

Kretschmer, R.R., & Kretschmer, L.W. (1978). Language development and intervention with the hearing impaired. Baltimore: University Park Press.

Livingston, S. (1989). Revision strategies of deaf student writers. American Annals of the Deaf, 134 (1), 21-26.

Moffett, J. (1979). Integrity in the teaching of writing. Phi Delta Kappan. December, Vol. 61, 276-279.

Moores, D.F. (1987). Educating the deaf (3rd edition). Boston: Houghton Mifflin Company.

Nelson, K. & Gruendel, J.M. (1979). At morning it's lunchtime: A scriptal view of children's dialogues. Discourse Processes, 2, 73-94.

Perl, S. (1979). The composing process of unskilled college writers. Research in the Teaching of English, 13, 317-339.

Quigley, S.P., & Paul, P.V. (1984). Language and deafness. San Diego: College-Hill Press.

Raven, J.C., Court, J.H. & Raven, J. (1983). Manual for Raven's progressive matrices and vocabulary scales. London: H.K. Lewis & Co. Ltd.

Rodda, M., & Grove, C. (1987). Language, cognition and deafness. Hillsdale, New Jersey: Lawrence Erlbaum Associates, Publishers.

Scardamalia, M., & Bereiter, C. (1982). Assimilative processes in composition planning. Educational Psychologist, 17(3), 165-171.

Spache, G.D. (1966). Good reading for poor readers. Champaign, Illinois: Garrard Publishing Company.

Sommers, N. (1980). Revision strategies of student writers and experienced adult writers. College Composition and Communication, 31, 378-388.

Stallard, C. (1974). An analysis of the writing behavior of good student writers. Research in the Teaching of English, 8, 206-218.

Walter, J. (1955). A study of the written sentence construction of a group of profoundly deaf children. American Annals of the Deaf, 100, 3, pp. 235-252.

Webster, A. (1986). Deafness, development and literacy. London: Methuen.

Webster's Third New International Dictionary of the English Language. (1961). Springfield, Mass.: G. & C. Merriam Company, Publishers.

Wood, D., Wood, H., Griffiths, A., & Howarth, I. (1986). Teaching and talking with deaf children. Chichester: John Wiley and Sons.

APPENDIX 1
EXAMPLES OF DEAFISMS

The following are some examples of deafisms which are presented by Kretschmer and Kretschmer (1978, p. 126-127):

- verb deletion/*be* or *have* deletion

Example: I deaf.

Correct Statement: I am deaf.

- negative outside the sentence

Example: I do use my ears no.

Correct Statement: I do not use my ears.

- conjunction deletion

Example: A TDD has a keyboard a window.

Correct Statement: A TDD has a keyboard and a window.

- incorrectly inflected infinitive

Example: Then she knows it is her turn to typed.

Correct Statement: Then she knows it is her turn to type.

- the use of infinitives to replace gerunds

Example: When we finish to talk, we both type "SK".

Correct Statement: When we finish talking, we both type "SK".

APPENDIX II

PARENT CONSENT FORM

Dear Parents/Guardians:

My name is Gail Edmunds and I am a Masters student at the University of Alberta. I am conducting a study of the revision performance of deaf writers. I am interested in the degree to which deaf students detect and revise flaws in written texts.

Participating students will be asked to complete a revision task, a standardized measure of general ability and a standardized measure of reading comprehension. These tasks will be administered to the students as a group. If, at any time, a student wishes to withdraw from the study, he or she will be free to do so.

Information regarding students' hearing losses will be required from school records. As well, the following information would be very helpful to the researcher (please complete if you are willing for your child to participate in the study):

My child was born with a hearing loss: yes _____ no _____ If no, at age_____
Mother's hearing status _____ Father's hearing status _____
Siblings hearing status _____
Mother's education/occupation _____
Father's education/occupation _____

Please be reassured that all information regarding students' backgrounds and their performances will be kept entirely confidential. I am interested in the performance of the group as a whole. A summary of group results will be distributed to teachers, parents and students at the conclusion of the research.

If you are willing to permit your child to participate, please sign the slip below.

Sincerely,

Gail Edmunds (Tel:438-0136)

I do not give permission for my child to part of this study. [__]
I give permission for my child to be part of this study. [__]
I give permission for Gail Edmunds to have access to my child's school records. [__]

Child's Name_____ Parent's Signature_____

STUDENT CONSENT FORM

Dear Student,

My name is Gail Edmunds and I am a student at the University of Alberta. I am studying the writing skills of deaf students. I am interested in how deaf writers fix errors that are found in written stories.

I would like you to be a part of my research. If you agree to participate, you will be asked to: 1) read stories and answer questions about the stories, 2) look at pictures and fill in the missing parts, and, 3) find and fix the problems in four written stories. You will do all of these activities with other students. If you feel uncomfortable with any of these activities, you will not have to finish them.

I am not interested in how you do by yourself. I want to know how the whole group does. Your name and your work will not be shown to anyone. I will send a report about how the whole group does to you, your teachers and your parents.

Please sign your name below if you want to take part in my study.

Sincerely,

Gail Edmunds

Tel: 438-0136

I understand that if I am uncomfortable, I do not have to finish the activities. [ ]

I agree to take part in the study. [ ]

Student's Name _____ Student's Signature _____

APPENDIX III

TEACHER QUESTIONNAIRE

Dear Teacher:

As you are aware, I will be conducting a study of the revision performance of deaf students. I am very pleased that students in your classroom will be participating in the study.

I would appreciate it if you would complete the following questionnaire in regards to the language arts curriculum that these students receive. Information on specific classrooms will be kept entirely confidential, but general information may be included in the research report.

If you have any questions regarding confidentiality or the contents of this questionnaire, please do not hesitate to contact me. Thank you for your co-operation.

Sincerely,

Gail Edmunds

Tel: 438-0136

---

1. Please indicate in which school setting you are located.

   a) a school for the deaf ____

   b) public school ____

2. If you are in a public school, please describe (i.e., segregated within the school, integrated for some subjects).

_____

_____

3. What form/s of communication is/are used within your classroom (i.e., ASL, signed English, oral)?

_____

_____

4. Is there an interpreter present in the classroom? yes ___ no ___

5. What language arts curriculum do you use?

_____

_____

6. Which of the following best describes your teaching approach in regards to your language arts program?

_____ a highly structured approach (primarily formal language instruction with accompanying texts, exercises and worksheets)

_____ a whole language approach (limited formal instruction/students' are encouraged to develop literacy skills through their own interests and experiences/ reading and writing for meaning is the emphasis)

7. Do your students express their thoughts, feelings and experiences in written form? yes ___ no ___

If yes, how many classroom hours per week are spent doing so. Please do not include time spent on worksheet activities. I am most interested in "creative" writing time.

___ less than 1 hour

___ 1 - 2 hours

___ 3 - 4 hours

___ 5 or more hours

8. Are the students encouraged to revise/edit their written productions?

yes ___ no ___

9. Have you formally instructed the students on how to revise their writing?

yes ___ no ___

If yes, briefly describe this instruction.

_____

_____

I would appreciate any additional comments you may have.

_____

_____

APPENDIX IV

TRAINING SESSION TEXT

Note: Flaws are highlighted in bold print. Brackets indicate an omission.

My School Day

My **shcool** day begins very early in the morning when my mom calls me to get out of bed. I do not have much time to get dressed and eat **his** breakfast because my bus leaves at 7:45. I meet my friends at the bus stop. **The ball is red. all** the way to school we talk about what we **have** going to do on the weekend. Our bus arrives at school just as the bell **Rings**. As soon as we get in school, we start **ower** work. **Then we eat lunch in the cafeteria.** We work all morning until the bell rings for recess[.] After recess we do more work or sometimes we have gym or music. When **Lunch** is over, we go back to our classroom until 3:10. Then it [is] time to get on the bus to go home.

APPENDIX V

TREATMENT PHASE TEXTS

Note: Flaws are highlighted in bold print. Brackets indicate an omission.

Text 1 How I Talk to My Friend on the Telephone

I am deaf. My best friend is deaf, too. I talk to her on the telephone. I do not use my ears. I use my eyes. First I dial my friend's telephone number. **A baby duck has soft feathers.** Then I put the telephone receiver on my TDD. A TDD is a machine that has a keyboard, **a baseball** and a window where I can read what I type. I type a message to my friend. **Then I put the telephone receiver back on the telephone.** I end with "GA". Then she knows it is her turn to type a message. I read what she types in my TDD window. We usually send a lot of messages. It is fun. When **they** are finished talking, we both type "SK". "SK" means stop keying. I **hate** talking to my best friend on the telephone. Do you call your friends on the telephone?

Text 2 How I Talk to My Friend on the Telephone

I am deaf. My best friend is **deef**, too. I talk to her on the telephone. I do not use my ears. I use my eyes. **first** I dial my friend's telephone number. Then I **poit** the telephone receiver on my TDD. **A tDD** is a machine that has a keyboard and a window where I can read what I type. I type a message to my friend. I end with "GA". Then she knows it is her turn to type **A** message. I read what she types in my TDD window. We usually send a lot of messages[.] It is fun. When we **ar** finished talking, we both type "SK". "SK" means stop keying. Then **i** put the telephone receiver back on the telephone[.] I like talking to my best friend on the telephone. Do you call your friends on the telephone[?]

Text 3 How I Talk to My Friend on the Telephone

I **[am]** deaf. My best friend **[is]** deaf, too. I talk to her on the telephone. I do use my ears **no**. I use my eyes. First I dial my friend's telephone number. Then I put the telephone receiver on my TDD. A TDD is a machine that has a keyboard **[and]** a window where I can read what I type. I type a message to my friend. I end with "GA". Then she knows it is her turn to **typed** a message. I read what she types in my TDD window. We usually send a lot of messages. When we finish **to talk**, we both type "SK". "SK" means stop keying. Then I put the telephone receiver back on the telephone. I like talking to my best friend on the telephone. Do you call your friends on the telephone?